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Abstract

Self-identity often predicts behavioural intentions after standard theory of planned behaviour (TPB) components are accounted for (Rise, Sheeran, & Hukkelberg, 2010). However, Fishbein and Ajzen (2010) claim this is due to conceptual similarity between self-identity and perceived importance of the behaviour. We examined this claim within the context of recycling food waste. Participants (N = 113) completed questionnaires assessing intentions, attitude, perceived behavioural control, perceived norms, perceived importance, self-identity, and past behaviour. Confirmatory factor analysis indicated that self-identity and perceived importance were distinct constructs. Further, after accounting for TPB components and perceived importance, self-identity explained a significant amount of additional variance in intentions. The present findings therefore do *not* support Fishbein and Ajzen's (2010) argument against the predictive utility of self-identity.

Keywords: self-identity, attitude, Theory of Planned Behaviour, recycling

The effect of self-identity alongside perceived importance within the Theory of Planned Behaviour

The theory of planned behaviour (TPB; Ajzen, 1991) posits that intentions are the most immediate determinant of volitional behaviour. In turn, intentions are argued to be influenced by three distinct factors: attitude, subjective norms, and perceived behavioural control. In this context, attitude is traditionally considered to reflect the extent to which an individual's overall evaluation of a given behaviour is favourable or unfavourable, subjective norms capture perceived social pressure to perform the behaviour, and perceived behavioural control refers to beliefs about whether one has control over, or is capable of, enacting the behaviour (Fishbein & Ajzen, 2010).

Initially, the normative component of the TPB solely comprised subjective norms, defined as the extent to which an individual believes others who are important to them think they should perform a given behaviour. More recently, however, the normative component has been expanded to include both injunctive norms (which Fishbein & Ajzen [2010] treat as synonymous with subjective norms) and descriptive norms, capturing the extent to which an individual believes important others are themselves performing a given behaviour (Fishbein & Ajzen, 2010). Together, injunctive and descriptive norms are now referred to as 'perceived norm' (or 'perceived norms' or 'perceived social norms') within the TPB approach (Fishbein & Ajzen, 2010).

The predictive utility of the TPB has received a large amount of empirical support (Armitage & Connor, 2001; McEachan, Connor, Taylor, & Lawton, 2011). For example, one meta-analysis indicated that the TPB accounted for an average of 39% of the variance in intentions, and 27% of the variance in behaviour (Armitage & Connor, 2001). However, a considerable amount of variance in both intentions and behaviour is often not accounted for

by the TPB (Ajzen, 2011). Accordingly, additional variables may improve the predictive utility of the TPB (Ajzen, 1991; Fishbein & Ajzen, 2010).

Self-identity

One particular construct that might be a beneficial addition to the TPB is self-identity (Charng, Piliavin, & Callero, 1988; Conner & Armitage, 1998; Rise et al., 2010; Sparks & Shepherd, 1992; Terry, Hogg, & White, 1999). The term self-identity refers to "salient and enduring aspects of one's self-perception" (Rise et al., 2010, p. 1087). These may take the form of social categorisations, with which specific meanings and expectations may be associated (e.g., thinking of oneself as an 'environmentally conscious' person may be associated with expectations such as buying organic food, or reducing one's carbon footprint). People are motivated to behave in ways that are consistent with the meanings and expectations associated with their self-identity, and as such, self-identity should guide behaviour (Rise et al., 2010). Importantly, the motivational underpinnings of behaviour guided by self-identity (i.e., maintaining and affirming one's self-identity) are argued to be distinct from those of attitudes, perceived norms, and perceived behavioural control (Rise et al., 2010). Therefore, self-identity should independently predict intentions after the standard TPB components have been accounted for.

The role of self-identity in predicting behaviour is also highlighted by theory on the *logic of appropriateness* (March, 1994). The *logic of appropriateness* posits that, when deciding on a course of action, people evaluate the situation and then consider what the most appropriate way for a person like them to behave would be. That is, people consider their self-identity within a social context and use it as a heuristic tool to guide their behaviour (cf. Case, Sparks, & Pavey, 2016).

Self-identity predicts intentions after standard TPB components have been accounted for in a range of behavioural contexts, including physical activity (Jackson, Smith, & Conner,

2003; Ries, Hein, Pihu, & Armenta, 2012), alcohol consumption (Conner, Warren, Close, & Sparks, 1999), sexual health (Booth, Norman, Harris, & Goyder, 2014), environmental activism (Fielding, McDonald, & Louis, 2008), and recycling (Mannetti, Pierro, & Livi, 2004; Nigbur, Lyons, & Uzzell, 2010; Terry et al., 1999). Further, a meta-analysis of 40 studies found that self-identity enhanced the prediction of intentions beyond TPB components, accounting for 6% of additional variance in intentions (Rise et al., 2010).

However, support for the inclusion of self-identity within the TPB is not unanimous. In particular, Fishbein and Ajzen (2010) argue that the way self-identity is measured overlaps conceptually with measures of past behaviour, descriptive norms, and the personal importance of behaviour, and that measures of self-identity may serve as proxies for these variables. More specifically in relation to the "importance" of behaviour, they claim that:

> ...self-identity basically assesses the extent to which a person values performance of the behaviour. Thus, it may be conceptually similar to attitude toward the behaviour but as an alternative attitude measure may capture aspects of attitude not represented in the traditional semantic differential instrument, and thus, this enriched attitude measure may add to the prediction of intentions. (p. 292)

They conclude, "…we see little value in pursuing self-identity, as it is currently operationalized, as an independent determinant of intention in our model of behavioural prediction" (Fishbein & Ajzen, 2010, p. 293). They also suggest that if items capturing perceived importance were included in the regression, then a separate measure of self-identity would become redundant as a predictor. They indicate that "semantic differential scales to capture this dimension might be formulated as follows: 'For me to perform the behaviour is *important-unimportant*, *essential-not essential*, *significant-insignificant.*' " (p. 292). This is the direct proposal that we refer to in the present research. The key question is: Will any

independent predictive effects of self-identity (on behavioural intentions) be removed if perceived importance (measured with the semantic differential scales suggested by Fishbein and Ajzen) is accounted for?

Elsewhere it has been suggested that people draw on their past behaviour to make inferences about what kind of a person they are. Consequently, self-identification may be predicated upon past behaviour (Fishbein & Ajzen, 2010; Rise et al., 2010). As such, measures of self-identity could serve as proxies for past behaviour, and self-identity should no longer predict behavioural intentions when past behaviour is accounted for. Importantly in this regard, a meta-analysis has indicated that self-identity *does* explain additional variance in intentions when TPB components and past behaviour are accounted for (Rise et al., 2010). Nevertheless, we include a measure of past behaviour in the present research in order to examine whether it removes any independent predictive effects of self-identity on behavioural intentions.

The Present Research

The present research sought to examine the issues outlined above in relation to recycling food waste. In 2015 only an estimated 13% of household food waste in the United Kingdom (UK) was disposed of in targeted collections, with the vast majority of household food waste instead being disposed of with 'general waste' collections where it would either be incinerated or go to landfill (Waste and Resources Action Programme, 2016). Food waste that goes to landfill produces methane (an environmentally harmful greenhouse gas) and can also contaminate water supplies (Adhikari, Barrington, & Martinez, 2006). Alternatively, food waste that is recycled can be used to generate energy and fertiliser (Khalid, Arshad, Anjum, Mahmood, & Dawson, 2011).

Data were collected from residents of the London Borough of Hackney (UK) where food waste recycling was collected weekly via a council-operated kerbside scheme. Our key

aims were to (a) assess whether self-identity and perceived importance represent distinct and separable constructs, and (b) examine whether self-identity explains additional variance in intentions to recycle food waste after TPB components, and a measure of perceived importance, are accounted for. We also aimed to examine whether accounting for past behaviour would cause any independent predictive effects of self-identity to disappear.

Method

Design and Procedure

The study employed a cross-sectional design. Participants were recruited via social media advertisements posted by Hackney Council, and an advertisement placed in a free magazine distributed to residents of the London Borough of Hackney inviting participants to take part in a study "looking at people's thoughts about food waste recycling". Data were collected via online questionnaires between January and March 2016. At the beginning of the questionnaire participants were provided with a description of Hackney Council's kerbside food waste recycling scheme; this was referred to throughout the rest of the questionnaire as the "blue bin service".

Participants

Participants (N = 113) were residents of the London Borough of Hackney, participating in return for a £200 (approximately €225, or $271 US) cash prize draw. One hundred and thirty-eight participants completed the questionnaire, 25 of whom were excluded because they reported composting their food waste at home. The final sample comprised 76 (67.26%) women and 37 (32.74%) men. Ages ranged from 20 to 77 years (mean = 40.26, median = 36, SD = 12.50). Eighty-four (74.34%) participants were either employed or self-employed. Eighty-one (71.68%) participants were educated to degree level or higher. Eighty-nine (78.76%) participants identified their ethnicity as White. The modal number of adults in participants' households was two; the modal number of children was zero. The

modal total annual household income was £60,000 (approximately €67,460, or $81,170 US) or greater.

Materials

Items assessing TPB constructs and self-identity were intermixed and presented in the same order to all participants. Items assessing past behaviour and demographics were presented at the end of the questionnaire. Unless otherwise indicated, responses were made using Likert-type scales ranging from *strongly disagree* [1] to *strongly agree* [7]. Internal reliability for each measure is reported in the form of Cronbach's alpha (α). The measures reported below were part of a larger study exploring food waste behaviour. Details of all measures included in this study not central to the current research focus are reported in the supplemental materials.

Attitude. The attitude measure comprised the mean of five semantic differential items (α = .87; Ajzen & Fishbein, 1980): 'Recycling my food waste using the blue bin service would be...' (*extremely unenjoyable* [1] to *extremely enjoyable* [7], *extremely unpleasant* [1] to *extremely pleasant* [7], *extremely bad* [1] to *extremely good* [7], *extremely worthless* [1] to *extremely valuable* [7], *extremely harmful* [1] to *extremely beneficial* [7]).

Perceived behavioural control. The perceived behavioural control measure comprised the mean of four items (α = .87): 'If I wanted to, I could recycle my food waste using the blue bin service', 'It is mostly up to me whether or not I recycle my food waste using the blue bin service', 'It would be possible for me to recycle my food waste using the blue bin service', and 'I believe that I have complete control over whether or not I recycle my food waste using the blue bin service'.

Perceived norm. The perceived norm measure comprised the mean of four items (α = .88): 'Most people who are important to me think that I should recycle my food waste using the blue bin service', 'The people in my life whose opinions I value would approve of me

recycling my food waste using the blue bin service', 'Many people like me recycle their food waste using the blue bin service', and 'Most people who are important to me recycle their food waste using the blue bin service'.

Perceived importance. Three semantic differential items were intended to measure perceived importance of performing the behaviour (α = .91; Fishbein & Ajzen, 2010): 'Recycling my food waste using the blue bin service would be...' (*extremely unimportant* [1] to *extremely important* [7], *extremely unessential* [1] to *extremely essential* [7], *extremely insignificant* [1] to *extremely significant* [7]).

Self-identity. The self-identity measure comprised the mean of three items (α = .87): 'I think of myself as the sort of person who would recycle their food waste using the blue bin service', 'I am the type of person who would recycle their food waste using the blue bin service', and 'Recycling my food waste using the blue bin service is an important part of who I am'.

Intentions. The intentions measure comprised the mean of three items (α = .95): 'I intend to recycle my food waste using the blue bin service', 'I plan to recycle my food waste using the blue bin service', and 'I will try to recycle my food waste using the blue bin service'.

Past behaviour. Participants were asked to indicate what percentage of their food waste they currently recycled using the blue bin service. Responses were made using an 11-point scale ranging from 0% to 100% in increments of 10%.

Demographic information. Participants were asked to indicate their gender, age, ethnicity, occupational status, education level, approximate total annual household income, and the number of adults and children living in their household.

Results

Bivariate correlations between the study variables, together with corresponding descriptive statistics, are presented in Table 1.

Confirmatory Factor Analysis

To examine the factor structure underlying attitude, perceived importance, and self-identity items, we conducted a confirmatory factor analysis. Specifically, to assess whether self-identity and perceived importance represented distinct constructs, we compared a model where the items assessing perceived importance and self-identity loaded on the same factor with a model where they loaded on two distinct factors. The confirmatory factor analysis was conducted using full-information maximum likelihood estimation within AMOS 23.0 (Arbuckle, 2014). Several indices were used to assess model fit including the Comparative Fit Index (CFI; where larger values indicate better fit; Hu & Bentler, 1999), the Root-Mean-Squared Error of Approximation (RMSEA; where smaller values indicate better fit; Hu & Bentler, 1999), chi-squared values (where smaller values indicate better fit), and difference in chi-squared values (where statistically significant differences indicate one model represents a significantly better fit than another).

Model 1 was a two-factor model (Figure 1). The five attitude items were specified to load on one latent factor: 'attitude'. The three perceived importance items, and the three self-identity items, were specified to load on a second latent factor: 'perceived importance'. In contrast, Model 2 was a three-factor model where the self-identity items were specified to load on a third latent factor: 'self-identity' (Figure 2).

The fit indices for Models 1 and 2 are reported in Table 2. Model 2 showed better fit than Model 1 in terms of CFI, RMSEA, and chi-squared values. Further, the difference in chi-squared values revealed the improvement in model fit was statistically significant, χ^2 (2) = 65.97, $p < .001$. This indicates that perceived importance and self-identity may be regarded

as separate constructs. Standardised factor loadings and correlations between factors are presented in Figures 1 and 2.

Regression Analysis

Hierarchical multiple regression was used to predict intentions to recycle. Attitude, perceived behavioural control, and perceived norm were entered in the first step of the regression. Perceived importance was entered in the second step. Self-identity was entered in the third step, allowing us to examine whether it accounted for any additional variance in intentions over and above the variables entered at steps one and two. Past behaviour was entered in the fourth step, in order to ascertain whether its inclusion reduced the unique contribution of self-identity to the prediction of intentions. All beta values reported in-text are standardised beta coefficients.

The results of the hierarchical multiple regression are provided in Table 3. As shown, the initial model with attitude, perceived behavioural control, and perceived norm significantly predicted intentions to recycle, F (3, 109) = 65.01, $p < .001$, $R^2 = .64$. Attitude ($\beta = .59$, $t = 8.23$, $p < .001$), perceived behavioural control ($\beta = .20$, $t = 3.34$, $p = .001$), and perceived norm ($\beta = .19$, $t = 2.63$, $p = .010$) emerged as significant linear predictors.

The inclusion of perceived importance in the second step failed to improve the amount of variance in intentions accounted for by the model, $\Delta F(1, 108) = 2.02$, $p = .158$, $\Delta R^2 = .01$. However, the inclusion of self-identity in the third step of the regression did significantly increase the amount of variance in intentions accounted for, $\Delta F(1, 107) = 7.58$, $p = .007$, $\Delta R^2 = .02$.

Prediction was further improved by the inclusion of past behaviour in the final step, $\Delta F(1, 106) = 19.68$, $p < .001$, $\Delta R^2 = .05$. In the final model, attitude ($\beta = .35$, $t = 3.62$, $p < .001$), self-identity ($\beta = .19$, $t = 2.07$, $p = .041$), and past behaviour ($\beta = .32$, $t = 4.44$, $p < .001$) were significant linear predictors of intentions.

Despite the large bivariate correlations between the measures of attitude, self-identity, and perceived importance (ranging r = .78 to .81), diagnostics including variance inflation factors and tolerance values gave no indication that multicollinearity was an issue in the analyses.

Discussion

The first aim of the present research was to examine whether self-identity and perceived importance represent separable constructs. A confirmatory factor analysis indicated that self-identity may indeed be regarded as distinct from perceived importance, thus providing preliminary evidence against arguments of conceptual overlap between these two constructs (cf. Fishbein & Ajzen, 2010). The second aim of this study was to examine whether self-identity could explain additional variance in intentions to recycle food waste after TPB components, and a measure of perceived importance, had been accounted for. A hierarchical multiple regression analysis showed that self-identity *did* account for a significant amount of additional variance in intentions. Further, the independent predictive effect of self-identity remained after the effect of past behaviour was accounted for.

That self-identity predicted intentions after TPB components were accounted for is consistent with much previous research (e.g., Booth et al., 2014; Nigbur et al., 2010; Ries et al., 2012). However, that this effect was found even though we included a measure of perceived importance serves to extend previous research. More specifically, our findings indicate the predictive effect of self-identity on intentions did not exist simply because self-identity served as a proxy for the perceived importance of the behaviour, as has been suggested to be the case by Fishbein and Ajzen. Indeed, the present findings stand in direct contrast to Fishbein and Ajzen's (2010) suggestion that this measure of perceived importance might remove any effect of self-identity on intentions. Further, the predictive effect of self-identity was presently found to be greater than that of perceived importance, which failed to

emerge as a significant predictor of behavioural intentions over and above the TPB components.

Similarly, despite suggestions of conceptual overlap between self-identity and past behaviour (as suggested by Fishbein and Ajzen, 2010) – possibly because people may infer their self-identity from previous actions (see Rise et al., 2010) – controlling for past behaviour in the present study did not cause self-identity to become redundant as a predictor. This finding is also consistent with meta-analysis indicating the predictive effect of self-identity is independent of past behaviour (Rise et al., 2010).

One of O'Keefe's (2002) criteria for evaluating the utility of additional predictors in the TPB is that the proposed predictor should explain a large amount of additional variance in intentions. While the amount of additional variance in intentions presently explained by self-identity was smaller than is typically observed (2% in the present study, compared to 6% in meta-analysis; Rise et al., 2010), this could be because self-identity plays a less important role in determining food waste recycling than it does other behaviours. Indeed, in two previous studies examining self-identity in the context of predicting recycling intentions the amounts of variance explained by self-identity were closer to that found in the present study, with the steps in which self-identity was included in the models explaining only 2% (Terry et al., 1999) and 3.5% (Nigbur et al., 2010) of additional variance. Therefore, the utility of self-identity as a predictor may be greater in behavioural contexts other than recycling, and future research should attempt to explore this. Indeed, another of O'Keefe's (2002) criteria is that proposed predictors should demonstrate their independent predictive effects across a range of behaviours.

Further, the present standardised beta coefficient for self-identity was larger than those for perceived behavioural control and perceived norm, and this was the case for the models both with and without past behaviour. As such, in comparison to other TPB

components, self-identity appears to be a relatively important predictor of behavioural intentions in the context of food waste recycling.

One limitation of the present research is that we were not able to assess actual food waste recycling behaviour. As such, we could not examine whether the effect of self-identity on behavioural intentions translated to an indirect effect of self-identity on behaviour. Previous research examining self-identity and the TPB in the context of recycling has assessed actual behaviour, and indirect effects of self-identity via intentions have been observed (Nigbur et al., 2010; Terry et al., 1999). Nevertheless, given the key focus of the present research was to examine the predictive utility of self-identity alongside TPB variables *and* a measure of perceived importance, establishing an effect of self-identity on behaviour remains an important goal. Future research should therefore aim to conduct similar tests of the independent predictive effects of self-identity using measures of actual behaviour.

While the confirmatory factor analysis revealed that significantly better fit was achieved when separate factors where specified for perceived importance and self-identity, the overall model fit was still relatively poor (Hu & Bentler, 1999). This suggests the present measurement of attitude, perceived importance, and self-identity might be improved upon. The items assessing attitude through the semantic differentials *extremely unenjoyable – extremely enjoyable* and *extremely unpleasant - extremely pleasant* had particularly low factor loadings, with the 'attitude' factor explaining only 45% and 37% of the variance in these items, respectively. Notably, these were the only two items assessing affective dimensions of attitude, which could indicate that in the context of food waste recycling affective attitudes are less important predictors than are instrumental attitudes. Moreover, this highlights the wider issue that the semantic differentials typically used in TPB research can be more or less relevant depending on the behaviour in question.

A further limitation relates to the generalisability of our findings. Modally, our sample comprised relatively high-earning individuals, living in households with one other adult and no children. Further, our sample was relatively highly-educated. It is possible that the importance of self-identity in guiding behaviour might be moderated by such demographic variables. Future research should therefore attempt to explore the predictive utility of self-identity in samples with varied demographic profiles.

In conclusion, whilst many of Fishbein and Ajzen's criticisms of 'self-identity effects' within the TPB seem very well founded, the present research indicates their arguments against the inclusion of self-identity within the TPB are not entirely justified. The present research showed that self-identity and perceived importance represent distinct and separable constructs, and that – after accounting for perceived importance – self-identity accounted for a significant amount of additional variance in intentions beyond that provided by TPB components. Further, the effect of self-identity remained when controlling for past behaviour. These findings provide an important extension to the body of research supporting the utility of self-identity within the TPB (e.g., Rise et al., 2010), and also contribute to other areas of research supporting the importance of identity in guiding behaviour (e.g., Case et al., 2016; Fritsche, Barth, Jugert, Masson, & Reese, in press; March, 1994). Together, this research indicates that interventions aiming to influence behaviour may benefit from attempting to promote self-identities consistent with performing the behaviour.

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Table 1

Bivariate correlations, means, and standard deviations

	2	3	4	5	6	7	*M*	*SD*
1. Attitude	.26**	.59***	.81***	.78***	.52***	.75***	5.49	1.10
2. Perceived behavioural control	-	.30**	.24*	.25**	.53***	.41***	6.21	1.28
3. Perceived norm	-	-	.63***	.66***	.54***	.60***	5.25	1.38
4. Perceived importance	-	-	-	.78***	.50***	.69***	5.93	1.10
5. Self-identity	-	-	-	-	.56***	.73***	5.96	1.26
6. Past behaviour	-	-	-	-	-	.70***	7.65	4.08
7. Intentions	-	-	-	-	-	-	6.19	1.51

*$p < .05$, **$p < .01$, ***$p < .001$.

Table 2

Fit indices for confirmatory factor analysis

	CFI	RMSEA	RMSEA 90% CIs	χ^2	df	*p*
Model 1	.86	.18	[.15, .21]	197.60	43	< .001
Model 2	.92	.14	[.11, .17]	131.63	41	< .001

CFI = Comparative Fit Index; RMSEA = Root-Mean-Squared Error of Approximation; CIs = confidence intervals.

Table 3

Summary of hierarchical multiple regression predicting intentions to recycle, showing standardised beta coefficients

	Step 1	Step 2	Step 3	Step 4
Attitude (β)	.59***	.49***	.39***	.35***
Perceived behavioural control (β)	.20**	.20**	.20**	.08
Perceived norm (β)	.19*	.16*	.10	.03
Perceived importance (β)	-	.15	.06	.06
Self-identity (β)	-	-	.28**	.19*
Past behaviour (β)	-	-	-	.32***
R^2	.64	.65	.67	.72
F	65.01***	49.72***	43.72***	46.07***
ΔR^2	-	.01	.02	.05
ΔF	-	2.02	7.58**	19.68***

*$p < .05$, **$p < .01$, ***$p < .001$

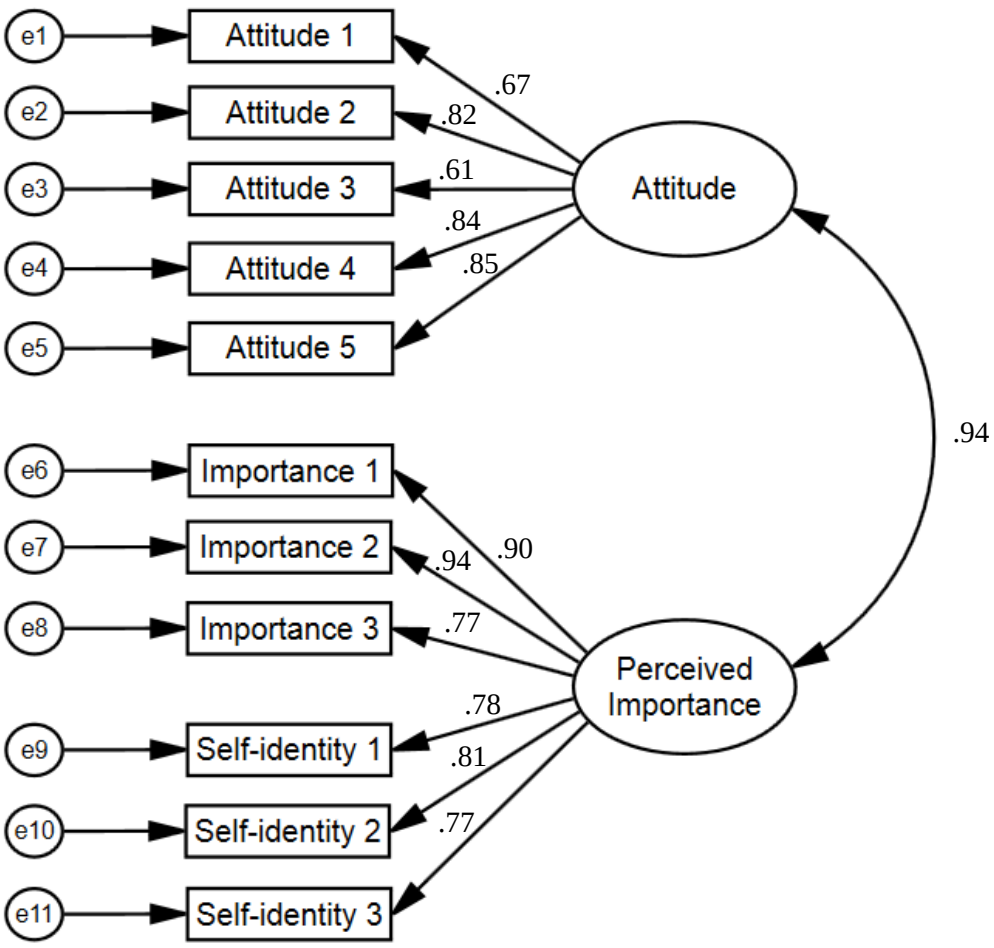

Figure 1. Model 1, showing standardised factor loadings and correlation.

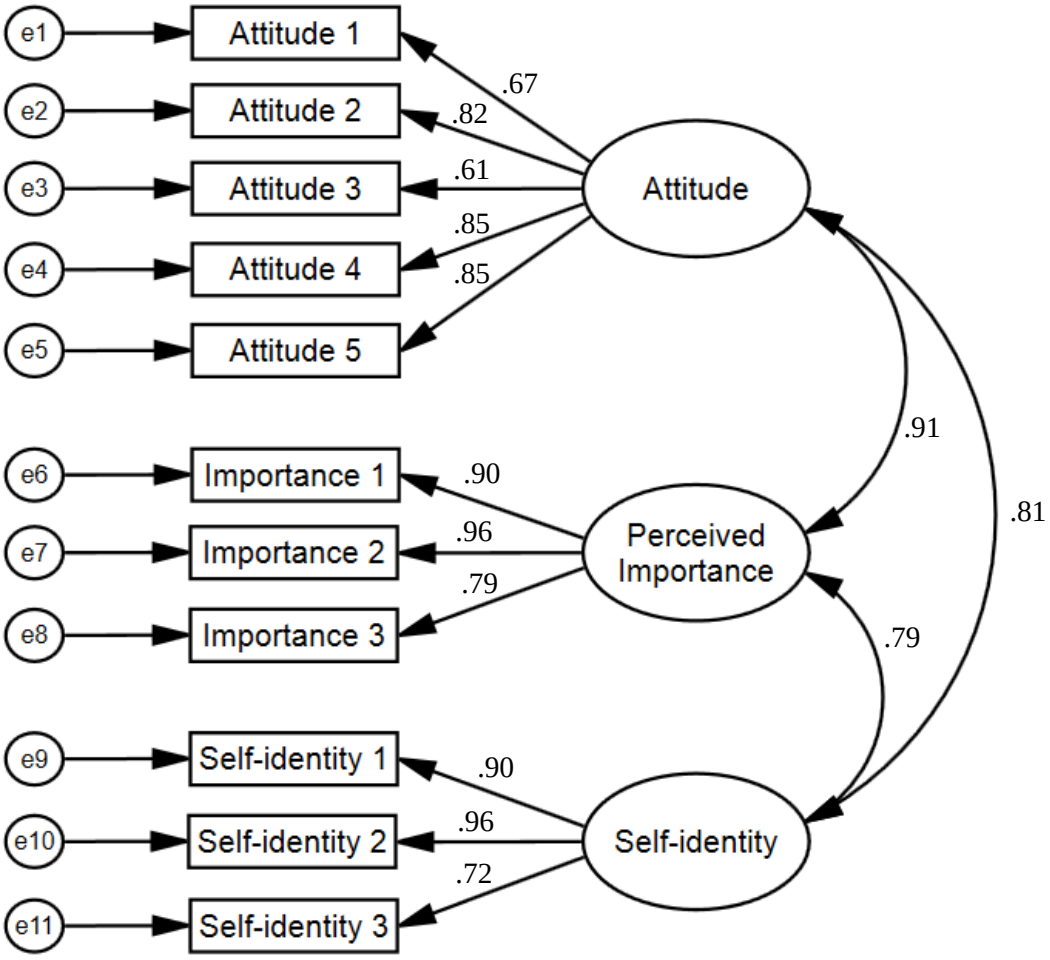

Figure 2. Model 2, showing standardised factor loadings and correlations.

Supplemental Material for "The effect of self-identity alongside perceived importance within the Theory of Planned Behaviour"

Additional measures included in the questionnaire:

- Behavioural beliefs
- Outcome expectancies
- Injunctive belief strength
- Motivation to comply
- Normative belief strength
- Identification with normative referent
- Control belief strength
- Control belief power
- Anticipated regret
- Moral norms
- Pro-environmental identity
- How non-recycled food waste was disposed of